

WHAT IS CLAIMED IS:

1. A method of fabricating an array substrate for use in a liquid crystal display (LCD) device using a four-mask process, the method comprising:

forming a first metal layer on a substrate;

forming a gate line, a gate electrode and a gate pad by patterning the first metal layer;

forming sequentially a first insulation layer, a semiconductor layer and a second metal layer over the patterned first metal layer and on the substrate;

forming a source electrode, a data line, a drain electrode and a data pad by patterning the second metal layer;

forming a second insulation layer on the patterned second metal layer and on the semiconductor layer;

forming a photoresist on the second insulation layer;

performing an exposure process on the photoresist using a mask;

removing completely a first portion of the photoresist over the gate pad after performing the exposure process;

removing incompletely a second portion of the photoresist over the data pad after performing the exposure process, wherein a residual photoresist remains over the data pad;

etching the second insulation and semiconductor layers over the gate pad while etching the residual photoresist over the data pad; and

etching simultaneously the first insulation layer over the gate pad and the second insulation layer over the data pad.

11/11/2011 10:10:10 AM

2. A method according to claim 1, wherein the mask that is used in irradiating the photoresist includes a half-tone pattern.

3. A method according to claim 1, wherein the mask that is used in irradiating the photoresist includes a diffraction slit.

4. A method according to claim 1, wherein the residual photoresist over the data pad has a thickness of more than 500Å.

5. A method according to claim 1, wherein the residual photoresist over the data pad has a thickness of less than 5000Å.

6. A method of fabricating an array substrate for use in a liquid crystal display (LCD) device, the array substrate having gate and data pads, the method comprising:

forming first and second insulation layers over the gate pad;

forming the second insulation layer on the data pad;

depositing a photoresist on the second insulation layer;

performing an exposure process on the photoresist using a mask;

removing completely a first portion of the photoresist over the gate pad after performing the exposure process;

removing incompletely a second portion of the photoresist over the data pad after performing the exposure process, wherein a residual photoresist remains over the data pad; and

etching the first and second insulation layers over the gate pad while etching the residual photoresist and second insulation layer over the data pad, wherein the residual photoresist acts as an etching stopper.

7. A method according to claim 6, wherein the mask that is used in the exposure process of the photoresist includes a half-tone pattern.

8. A method according to claim 6, wherein the mask that is used in the exposure process of the photoresist includes a diffraction slit.

9. A method of fabricating an array substrate for use in a liquid crystal display (LCD) device, the method comprising:

patterning a first metal layer on the array substrate;

forming a first insulation layer and a semiconductor layer over the first metal layer;

patterning a second metal layer on the array substrate;

forming a second insulation layer over the second metal layer;

forming a photoresist over the second insulation layer;

providing a mask over part of the photoresist layer, wherein a designated portion of the mask includes a half-tone pattern for partially exposing a portion of the photoresist beneath the designated portion when the photoresist and the mask are irradiated;

irradiating the photoresist and the mask; and

etching the first insulation layer, the second insulation layer and the semiconductor layer to expose portions of the first metal layer and the second metal layer.

10. The method according to claim 9, wherein a residual photoresist remains after irradiating the photoresist and the mask.

11. The method of claim 10, further comprising the step of removing the residual photoresist.

⑫. A method of fabricating an array substrate for use in a liquid crystal display (LCD) device, the method comprising:

patterning a first metal layer on the array substrate;

forming a first insulation layer and a semiconductor layer over the first metal layer;

patterning a second metal layer on the array substrate;

forming a second insulation layer over the second metal layer;

forming a photoresist over the second insulation layer;

providing a mask over part of the photoresist layer, wherein a designated portion of the mask includes a diffraction slit for partially exposing a portion of the photoresist beneath the designated portion when the photoresist and the mask are irradiated;

irradiating the photoresist and the mask; and

etching the first insulation layer, the second insulation layer and the semiconductor layer to expose portions of the first metal layer and the second metal layer.

13. The method according to claim 12, wherein a residual photoresist remains after irradiating the photoresist and the mask.

14. The method of claim 13, further comprising the step of removing the residual photoresist.

15. A method of fabricating an array substrate for use in a liquid crystal display (LCD) device, the method comprising:

patterning a first metal layer on the array substrate;

forming a first insulation layer and a semiconductor layer over the first metal layer;

patterning a second metal layer on the array substrate;

forming a second insulation layer over the second metal layer;

forming a photoresist over the second insulation layer;

completely exposing a first portion of the photoresist, partially exposing a second portion of the photoresist and shielding a third portion of the photoresist from exposure; and

etching the first insulation layer, the second insulation layer and the semiconductor layer to expose portions of the first metal layer and the second metal layer.

16. The method of claim 15, further comprising the step of removing the second portion of photoresist after the etching step.

11/23/2004 10:00 AM